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**Sunoco Inc.**  
100 Green Street  
PO Box 426  
Marcus Hook PA 19061

**CERTIFIED MAIL RETURN RECEIPT: 7008 1300 0002 0946 5919**

January 31, 2011

Director, Air Enforcement Division  
Office of Civil Enforcement  
U. S. Environmental Protection Agency  
Mail Code 2242-A  
1200 Pennsylvania Avenue, N. W.  
Washington, DC 20460-0001

**RE: USA v. Sunoco, Inc. et. al. – Civil Action No. 05 CV-02866**  
**10<sup>th</sup> Semi-Annual Progress Report**  
**June 30, 2010 – December 31, 2010**

Dear Sirs:

Pursuant to Paragraph #114 of the Consent Decree entered in the above noted Civil Action, enclosed is Sunoco's Tenth Semi-Annual Progress Report.

Should you have any questions concerning the enclosed report, please contact me at 610-859-1695.

*I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete.*

Signed: Terry A. Soule Date: 1/30/11  
Terry A. Soule  
Director, Environmental Services & Policy  
Sunoco, Inc.

Sincerely,

Terry A. Soule  
Terry A. Soule  
Director, Environmental Services & Policy  
Sunoco, Inc.

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Director, Air Enforcement Division

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File: Global Settlement Periodic Reports, 2011

cc: Chief, Environmental Enforcement Section  
U. S. Department of Justice  
Certified Receipt: 7008 1300 0002 0946

Director, Air Enforcement Division  
c/o Matrix New World Engineering  
Certified Receipt: 7008 1300 0002 0946 5933

U. S. EPA Region III  
Certified Receipt: 7008 1300 0002 0946 5940

Pennsylvania Department of Environmental Protection  
Mr. James Rebarchak, Air Program Manager  
Southeast Regional Office  
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Oklahoma Department of Environmental Quality  
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Philadelphia Air Management Service  
Certified Receipt: 7008 1300 0002 0946 5971

U.S. EPA Region V  
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Ohio Environmental Protection Agency  
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**Sunoco Facility: Marcus Hook**  
**Report Title: Semi-Annual Consent Decree Compliance Report # 10**  
**Reporting Period: 7/1/10 – 12/31/10**

**Paragraph 114 Reporting and Recordkeeping of Affirmative Relief / Environmental Projects and Emission Data in Section V with Certification**

**I. Progress Report for Implementation of (section V) Affirmative Relief/Environmental Projects**

A. NO<sub>x</sub> Emissions Reductions from the FCCU

**Engineering design work for Marcus Hook is progressing.**

B. SO<sub>2</sub> Emissions Reductions from the FCCU

**Engineering design work for Marcus Hook is progressing.**

C. Control of PM Emissions from FCCU

**Paragraph 16 – Marcus Hook has been compliant with the 1.0 lbs/1000 lbs of coke burn PM requirement as demonstrated in July 2010 using a method 5 test.**

D. Control of CO Emissions from FCCU

**Paragraph 19 – Marcus Hook Refinery is compliant with the requirements of this paragraph. There were deviations to the one hour CO standard due to upsets.**

E. NSPS Subparts A and J Applicability at FCCU Regenerators

**Paragraph 25 – Marcus Hook is compliant with Subparts A & J.**

F. NO<sub>x</sub> Emission Reductions from Heaters and Boilers

**Paragraph 31 – The final detailed NO<sub>x</sub> Control Plan was submitted to EPA and the Appropriate Plaintiffs/Intervenors on 06/14/10.**

G. SO<sub>2</sub> Emissions Reductions from and NSPS Applicability for Heaters and Boilers

**Paragraph 37 – No changes have been made since the last progress report.**

#### I. Sulfur Recovery Plants - NSPS Applicability

**Marcus Hook is compliant with Subpart J for Sulfur Plant/Tailgas Units.**

#### J. Hydrocarbon Flaring Devices

**Paragraph 48 – Alternative Monitoring Protocols (“AMPs”) for the 10 Plant and 12 Plant Flares were submitted to EPA on November 12, 2008 and implemented beginning January 1, 2009. The AMPs were approved by the EPA on May 19, 2009. Five Car Seal Tags on the flare connections were found to have weathered off in September of 2010. In all five cases the valves were found in the closed position (not open to the flare). All Car Seals in the 10 and 12 plant area were replaced (84 total) with stronger more weather resistant ties and new identification tags.**

**The Alternative Monitoring Protocol for the Main (EC) Flare was submitted on September 2, 2010. An amended AMP for the Main Flare was submitted on December 10, 2010. The amended AMP added a small number of flare connections found during a field audit while EPA review was ongoing. EPA approval of the AMP is pending. .**

#### K. Control of Acid Gas Flaring and Tail Gas Incidents

**Paragraphs 52 & 53 – Sunoco had no Acid Gas or Tail Gas incidents during this reporting period.**

#### L. Control of Hydrocarbon Flaring Incidents

**Paragraph 64 – Marcus Hook had two Hydrocarbon Flaring incidents during this reporting period. The incidents occurred on October 22 and December 14, The Root Cause Failure Analysis investigation reports are attached in Appendix I.**

#### M. Benzene Waste NESHAP Program Enhancements

##### **Paragraphs 65-77**

1. The BWON exempted quantity was calculated to be 8.00E-02 MG for the third quarter and 9.23E-02 MG for the fourth quarter of 2010. The 2010 annual BWON exempted quantity, based on EOL sampling, is calculated to be 3.41E-01 MG.

#### N. Leak Detection and Repair Program Enhancements

##### **Paragraphs 78-92**

1. LDAR Monitoring Technician Refresher Training is conducted by Team Inc on a monthly basis. LDAR Technicians received facility refresher training in December 2010. The LDAR/BWON Coordinator attended two training sessions held by Sage Environmental; one in October and one in December.

2. Result of Third Part Audit and Corrective Actions.

A Third Party Audit of the facility LDAR Program was conducted by Sage Environmental in August of 2010, covering the areas described by the Consent Decree:

O. Incorporation of Consent Decree Requirements into Federally Enforceable Permit(s)

**Paragraphs 93-96: The Marcus Hook Refinery is compliant with the requirements of these paragraphs.**

**II. Summary of (section V) Emissions Data**

Included herein.

**III. Description of Any Problems Anticipated with Meeting (section V) Requirements**

N/A

**IV. Additional Matters to be Brought to the Attention of EPA and the Appropriate Plaintiff/Intervenor**

N/A

**Paragraph 112 SUPPLEMENTAL AND COMMUNITY ENVIRONMENTAL PROJECTS (SCEP) AND STATE AND LOCAL ENVIRONMENTALLY BENEFICIAL PROJECTS (SLEBP) in Section VIII with Certification**

**I. Progress Report for Each SCEP or SLEBP (section VIII)**

**Paragraph 104: In progress**

**Paragraph 105: Complete**

**Paragraph 106: Complete**

**Paragraph 107: Complete**

**Paragraph 108: Complete**

**Paragraph 109: Complete**

**II. Completed SCEP or SLEBP (section VIII)**

A. Detailed Description of Each SCEP or SLEBP Project as Implemented

N/A

B. Brief Description of Any Significant Operating Problems Encountered

N/A

C. Certification That Each Project Has Been Fully Implemented Pursuant to the Provisions of this Consent Decree

N/A

D. Description of the Environmental and Public Health Benefits Resulting From Implementation of Each Project (including quantification of the benefits and pollutant reductions, where practicable)

N/A

## **APPENDIX I**

### **Marcus Hook**

#### **Hydrocarbon Flaring Incidents**



## Investigation Report for Acid Gas Flaring or Hydrocarbon Flaring Resulting in $\geq 500$ lbs. of $\text{SO}_2$ Released

<b>Date of Report:</b>	12/20/10	<b>Incident Type:</b> (Check one) <input type="checkbox"/> Acid Gas Flaring: <input checked="" type="checkbox"/> Hydrocarbon Flaring:	
<b>Date(s) of Incident:</b>	(Beginning) 10/21/10 (End) 10/22/10	<b>Flaring start/end time:</b>	<b>From: To: intermittent</b>
<b>Amount of <math>\text{SO}_2</math> Released:</b>	EC Flare 814 lbs Pounds <input checked="" type="checkbox"/> Tons <input type="checkbox"/>	<b>Location at the Marcus Hook Refinery:</b>	12-3 Flare <input type="checkbox"/> 10-4 Flare <input type="checkbox"/> EC Flare <input checked="" type="checkbox"/>

**Incident Description:** Crude Unit overhead gases; gases from the 17 Plant Reformer Unit; and gases from the 12-3 Hydrogen Desulfurizer unit are processed in a compressor at Sunoco's 15-2S Gas Plant. This compressor is called the #3 Clark Compressor. The thrust bearing on the #3 Clark Compressor developed high displacement and the equipment automatically shutdown (as per design) on 10/21/10 at 8:56 PM. This compressor shutdown resulted in flaring at the Marcus Hook Refinery's Main Flare. This Main Flare is also called the EC flare.

During the evening of 10/21/10 technicians worked throughout the evening to diagnose and repair the cause of the high thrust that had shutdown the #3 Clark. To mitigate flaring during the troubleshooting period the 12-3 Hydrogen Desulfurizing Unit (HDS) was shutdown and operating parameters on the crude units were adjusted to minimize the flow of gases to the flare. It was determined that the cause of the high thrust was due to issues with the antisurge instrumentation on the compressor. The compressor was restarted ~ 11:30 AM on 10/22/10 with adjusted settings on the thrust shutdown switches. All flaring ended at that time.

On 10/29/10 the compressor was taken down for a planned shutdown. During that shutdown the thrust bearing was replaced and the anti surge instrumentation was reviewed and replaced (where necessary).

**Root Cause of Incident:** Root cause of the flaring was the #3 Clark Compressor shutdown. #3 Clark Compressor shutdown was due to high vibration originating from the thrust bearing. The high vibration originating from the thrust bearing was caused by issues with the antisurge instrumentation on the compressor.



**Contributing Causes of Incident:** None

**Preventive Actions (Actions to reduce likelihood of Recurrence):** Replace thrust bearing on the compressor - done 10/29/10. to 11/2/10.

Review and replace (as necessary) all the antisurge components of the compressor - done 10/29/10 to 11/2/10

Add monthly preventive maintenance requirements on the compressors antisurge instrumentation - done December 2010.

Add administrative controls to allow bypassing of the antisurge protection on the compressor with the proper management approval.

**Do Stipulated Penalties Apply? (Acid Gas Flare Only)** YES ☐ NO ☒

**If YES explain:**

- ☐ Yes ☐ No Error resulting from careless operation  
☐ Yes ☐ No Failure to follow written procedures  
☐ Yes ☐ No Failure of equipment due to failure by Sunoco to operate and maintain equipment in a manner consistent with good engineering practices  
☐ Yes ☐ No SO<sub>2</sub> rate greater than 20 lbs/hour continuously for 3 hours or more where Sunoco did not follow PMO plan and took no action to limit duration and/or quantity of SO<sub>2</sub> emissions  
☐ Yes ☐ No Acid gas incidents more than 5 in rolling 12 months

Hydrocarbon incident - non acid gas flaring.

**If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:**

N/A: ☐ Completed: ☒ Not Completed: ☐ Explain:  
All corrective actions completed.

Approval Section		
Title	Print Name	Date
Environmental Engineer:	Paul J. Braun	12/20/10
Environmental Lead:	Scott Baker	12/21/10
Operations Manager:	Scott Stebbins	12/29/10

<b>Date of Report:</b>	12/20/10	<b>Incident Type: (check one)</b>	<b>Acid Gas Flaring:</b> <input type="checkbox"/>
			<b>Hydrocarbon Flaring</b> <input checked="" type="checkbox"/>

**Calculation of Quantity of SO<sub>2</sub> Released from Acid Gas Flaring (Round to the nearest 0.1 Tons):**  
Tons of SO<sub>2</sub> = [FR][TD][ConcH<sub>2</sub>S][8.44x10<sup>-5</sup>] (See p. 52 of 114 CD)  
FR = Average Flow Rate of Gas During Flaring Incident in scfh  
TD = Total Duration of Flaring Incident in hours  
ConcH<sub>2</sub>S = Average Concentration of Hydrogen Sulfide in gas during flaring incident  
8.44x10<sup>-5</sup> = [lb mole H<sub>2</sub>S/379 scf H<sub>2</sub>S][64 lbs SO<sub>2</sub>/lb mole H<sub>2</sub>S][1 Ton/2000 lbs]

Reason for any missing data: No missing data  
Basis for any data that was estimated:

**Tons of SO<sub>2</sub>** = EC flare (non acid gas) = 884 minutes/60 minutes/hr \* .863 moles per hour of SO<sub>2</sub> (average) \* 64 lbs/mole = 814 lbs SO<sub>2</sub>.

**Rate of SO<sub>2</sub> Emissions During Acid Gas Flaring: ER = [FR][ConcH<sub>2</sub>S][0.169]**  
ER = Emission Rate in pounds of SO<sub>2</sub> per hour  
FR = Average Flow Rate of Gas During Flaring Incident in scfh  
ConcH<sub>2</sub>S = Average Concentration of Hydrogen Sulfide in gas during flaring incident  
0.169 = [lb mole H<sub>2</sub>S/379 scf H<sub>2</sub>S][1.0 lb mole SO<sub>2</sub>/1 lb mole H<sub>2</sub>S][64 lbs SO<sub>2</sub>/lb mole SO<sub>2</sub>]

Reason for any missing data: none  
Basis for any data that was estimated:

**Emission Rate of SO<sub>2</sub>** = 55.2 lbs/hr

**Comments:**

**None**



## Investigation Report for Acid Gas Flaring or Hydrocarbon Flaring Resulting in $\geq 500$ lbs. of SO<sub>2</sub> Released

<b>Date of Report:</b>	12/22/10	<b>Incident Type:</b> (Check one) <input type="checkbox"/> Acid Gas Flaring: <input checked="" type="checkbox"/> Hydrocarbon Flaring:	
<b>Date(s) of Incident:</b>	(Beginning) 12/14/10 (End) 12/15/10	<b>Flaring start/end time:</b>	<b>From: To: intermittent</b>
<b>Amount of SO<sub>2</sub> Released:</b>	EC Flare; 94 lbs; 10-4 Flare; 9791 lbs  Pounds <input checked="" type="checkbox"/> Tons <input type="checkbox"/>	<b>Location at the Marcus Hook Refinery:</b>	12-3 Flare <input type="checkbox"/> 10-4 Flare <input checked="" type="checkbox"/> EC Flare <input checked="" type="checkbox"/>

**Incident Description:** The Gases generated in the Fluid Catalytic Cracking (FCC) Unit are handled by a compressor that sends these gases to Sunoco's 15-2B Gas Plant. This compressor is called the #1 Clark Compressor. The compressor is powered by a steam turbine. On 12/14/10 the electronic governor controller failed causing the steam turbine and the gas compressor to trip.

During the initial trip of the of the Wet Gas Compressor the wet gas pressure on suction drum rose and caused the pressure control valves opens to the flare (to protect the equipment). The FCC Unit charge rate was immediately cut to the minimum in order to bypass this Wet Gas Compressor. Once the FCC charge is at the minimum rate some flaring continues as without the Wet Gas Compressor in service we are unable to get all the gases to the 15-2B gas plant.

During the evening of 12/14/10 instrument technicians worked to diagnose the cause of the steam turbine shutdown. It was found that a defective power supply card to the steam governor valve failed. The Card was replaced. The stream turbine and the compressor were restarted and the flaring stopped.

**Root Cause of Incident:** Root cause of the flaring was the #1 Clark Compressor shutdown. #1 Clark Compressor shutdown was due to the loss of the steam turbine governor control valve. The governor control valve was found to have a failed power supply card.

**Contributing Causes of Incident:** The cold weather made it more difficult to restart the compressor; there were issues with #3 CO boiler at 10 plant while the compressor was down; there were freeze up issues with the wet gas line at 12-3 unit.

**Preventive Actions (Actions to reduce likelihood of Recurrence):** Replace entire governor valve controller assembly (including power supply). - done 12/14/10. to 12/15/10.

Stock Governor assembly at refinery. done 12/15/10

**Do Stipulated Penalties Apply? (Acid Gas Flare Only)** YES ☐ NO ☒

**If YES explain:**

- ☐ Yes ☐ No Error resulting from careless operation  
☐ Yes ☐ No Failure to follow written procedures  
☐ Yes ☐ No Failure of equipment due to failure by Sunoco to operate and maintain equipment in a manner consistent with good engineering practices  
☐ Yes ☐ No SO<sub>2</sub> rate greater than 20 lbs/hour continuously for 3 hours or more where Sunoco did not follow PMO plan and took no action to limit duration and/or quantity of SO<sub>2</sub> emissions  
☐ Yes ☐ No Acid gas incidents more than 5 in rolling 12 months

Hydrocarbon incident - non acid gas flaring.

**If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:**

N/A: ☐ Completed: ☒ Not Completed: ☐ Explain:  
All corrective actions completed.

**Approval Section**

Title	Print Name	Date
Environmental Engineer:	Paul J. Braun	12/22/10
Environmental Lead:	Scott Baker	12/22/10
Operations Manager:	Scott Stebbins	12/28/10

<b>Date of Report:</b>	12/22/10	<b>Incident Type: (check one)</b>	<b>Acid Gas Flaring:</b> <input type="checkbox"/> <b>Hydrocarbon Flaring</b> <input checked="" type="checkbox"/>
<p><b>Calculation of Quantity of SO<sub>2</sub> Released from Acid Gas Flaring (Round to the nearest 0.1 Tons):</b></p> <p>Tons of SO<sub>2</sub> = [FR][TD][ConcH<sub>2</sub>S][8.44x10<sup>-5</sup>] (See p. 52 of 114 CD)  FR = Average Flow Rate of Gas During Flaring Incident in scfh  TD = Total Duration of Flaring Incident in hours  ConcH<sub>2</sub>S = Average Concentration of Hydrogen Sulfide in gas during flaring incident  8.44x10<sup>-5</sup> = [lb mole H<sub>2</sub>S/379 scf H<sub>2</sub>S][64 lbs SO<sub>2</sub>/lb mole H<sub>2</sub>S][1 Ton/2000 lbs]</p> <p>Reason for any missing data: No missing data  Basis for any data that was estimated:</p> <p><b>Tons of SO<sub>2</sub></b> = 10-4 flare (non acid gas) = 1476 minutes/60 minutes/hr * 6.22 moles per hour of SO<sub>2</sub> (average) * 64 lbs/mole = 9791 lbs SO<sub>2</sub>. Time = 9:20 AM 12/14/10 to 9:50 AM 12/15/10.</p> <p>12-3 flaring (non acid gas) = 64 minutes/60 minutes/hr * 1.1 moles per hour of SO<sub>2</sub> (average) * 64 lbs/mole = 75 lbs of SO<sub>2</sub>. Time = 3:12 AM to 4:16 AM 12/15/10</p> <p>EC flaring (non acid gas) = 1444 minutes/60 minutes/hr * .06 moles per hour of SO<sub>2</sub> (average) * 64 lbs/mole = 94 lbs SO<sub>2</sub>. Time = 10:06AM 12/14/10 to 10:10 AM 12/15/10</p>			
<p><b>Rate of SO<sub>2</sub> Emissions During Acid Gas Flaring: ER = [FR][ConcH<sub>2</sub>S][0.169]</b></p> <p>ER = Emission Rate in pounds of SO<sub>2</sub> per hour  FR = Average Flow Rate of Gas During Flaring Incident in scfh  ConcH<sub>2</sub>S = Average Concentration of Hydrogen Sulfide in gas during flaring incident  0.169 = [lb mole H<sub>2</sub>S/379 scf H<sub>2</sub>S][1.0 lb mole SO<sub>2</sub>/1 lb mole H<sub>2</sub>S][64 lbs SO<sub>2</sub>/lb mole SO<sub>2</sub>]</p> <p>Reason for any missing data: none  Basis for any data that was estimated:</p> <p><b>Emission Rate of SO<sub>2</sub></b> = 10-4 flaring = 398 lbs/hr (average); 12-3 flaring 70 lbs/hr (average); EC flaring = 3.84 lbs/hr</p>			
<p><b>Comments:</b></p> <p>None</p>			



**Sunoco Facility: Philadelphia**  
**Report Title: Semi-annual Consent Decree Compliance Report # 10**  
**Reporting Period: 7/1/10 – 12/31/10**

**Paragraph 114 Reporting and Recordkeeping of Affirmative Relief / Environmental Projects and Emission Data in Section V with Certification**

**I. Progress Report for Implementation of (section V) Affirmative Relief/Environmental Projects**

**A. NO<sub>x</sub> Emissions Reductions from the FCCU**

**Paragraphs 12 – 13: There were no NO<sub>x</sub> exceedances of the CD limits during the period.**

**B. SO<sub>2</sub> Emissions Reductions from the FCCU**

**Paragraphs 14 – 15: The Philadelphia Refinery is compliant with the requirements of these paragraphs. There were no SO<sub>2</sub> exceedances of the CD limits during the period.**

**C. Control of PM Emissions from FCCU**

**Paragraph 16 – The Philadelphia Refinery is compliant with the requirements of this paragraph.**

**D. Control of CO Emissions from FCCU**

**Paragraph 19 – There were no consent decree CO exceptions noted during the reporting period pursuant to paragraph 19.**

**Paragraph 20 – Philadelphia Refinery is compliant with the requirements of this paragraph.**

**E. NSPS Subparts A and J Applicability at FCCU Regenerators**

**Paragraphs 24 – 25: There were no Subpart A or J exceptions during the reporting period.**

**However, an emergency shutdown of the 868 unit caused Subpart J opacity exceptions on July 29 for 4 hours during the restart of the unit. In addition, during the shutdown of the unit on July 25, the opacity permit limit was exceeded during one hour. However, during this hour the opacity was below 30% and therefore not a Subpart J opacity exception.**

**F. NO<sub>x</sub> Emission Reductions from Heaters and Boilers**

**Paragraph 31 Paragraph 31 – All work has been completed. We are currently under a public comment period for the permit for new NO<sub>x</sub> limits for the 210 unit H-201 heater**



G. SO<sub>2</sub> Emissions Reductions from and NSPS Applicability for Heaters and Boilers

**Paragraphs 36 – 38: There were two events that caused exceedance of the three hour rolling average H<sub>2</sub>S limit at NSPS Subpart J regulated heaters as shown below:**

**On August 29, 2010, a foaming event at the 867 amine regenerator caused an H<sub>2</sub>S spike in the fuel gas resulting in three 3-hr average exceedances of the 162 H<sub>2</sub>S ppm limit (248, 280, 253ppm) at the 1332 H-2 heater before it could be swung to alternate low sulfur fuel.**

**On October 24, 2010, a foaming event at the 862 amine regenerator caused an H<sub>2</sub>S spike in the fuel gas resulting in three 3-hr average exceedances of the 162 H<sub>2</sub>S ppm limit (255, 319, 294 ppm) at the 859 1H-1 heater before it could be swung to alternate low sulfur fuel**

I. Sulfur Recovery Plants - NSPS Applicability

**Paragraphs 40 – 47: The Philadelphia Refinery is compliant with the requirements of these paragraphs**

J. Hydrocarbon Flaring Devices

**Paragraphs 48 – 50: The following is a summary of options the Philadelphia Refinery has elected to comply with regarding the CD NSPS requirements for flares.**

<b>Philadelphia Flares</b>	<b>Compliance Status</b>
PB North Yard LPG Flare	NSPS. Have an approved AMP. Please note that a request to revise this approved AMP was submitted to USEPA and approved by them in April, 2010.
PB South Yard North Flare	NSPS. Operating and maintain a flare gas recovery system.
PB 867 Acid Gas Flare	NSPS. This is not currently a fuel gas combustion device. The purge and pilot gas is comprised of purchased natural gas. When the purge and pilot gas is converted to refinery fuel gas, that gas will be monitored to be compliant with Subpart J. The flare only receives non-routinely generated gases, process upset gases, fuel gas released as a result of relief valve leakage or gases released due to other emergency malfunctions.
PB 867 SWS Gas Flare	NSPS. This is not currently a fuel gas combustion device. The purge and pilot gas is comprised of purchased natural gas. When the purge and pilot gas is converted to refinery fuel

	gas, that gas will be monitored to be compliant with Subpart J. The flare only receives non-routinely generated gases, process upset gases, fuel gas released as a result of relief valve leakage or gases released due to other emergency malfunctions.
GP 1231/1232 Flares	NSPS status began 12/31/2010. AMP submitted in July, 2010.
GP 433 Flare	NSPS status began 12/31/2010. AMP submitted in July, 2010.

#### K. Control of Acid Gas Flaring and Tail Gas Incidents

**Paragraphs 51 – 63: Acid gas flaring computational methods have been in place since the DOE. There were no AG flaring events to note for this reporting period.**

#### L. Control of Hydrocarbon Flaring Incidents

##### **Paragraph 64:**

**No Hydrocarbon Flaring Incidents occurred during this reporting period.**

**The uncompleted work from the Hydrocarbon Flaring Incident that occurred on May 26, 2009 and reported in the January 29, 2010 semi-annual report was completed. All planned work on the April 17, 2010 Hydrocarbon Flaring Incident that was reported in the last semi-annual report was completed by the anticipated due date of January 1, 2011. As a result of this review, some equipment changes will be completed during a partial planned process outage that will occur during the first semi-annual period of 2011**

#### M. Benzene Waste NESHAP Program Enhancements

##### **Paragraphs 65-77**

- 1. Relative to BWON training conducted over this semi-annual period, one technician was trained on how to perform monitoring of carbon installations, vacuum trucks and containers.**
- 2. The BWON exempted quantity was calculated to be, based on EOL sampling data, 0.16 MG for the third quarter and 0.012 MG for the fourth quarter of 2010. The 2010 annual BWON exempted quantity, based on EOL sampling is 0.28. See Appendix I for EOL sampling results.**

#### N. Leak Detection and Repair Program Enhancements

**Paragraphs 78 – 92: The third LDAR Third Party Compliance Audit was conducted pursuant to Paragraph 80 during the fourth quarter.**

**All corrective actions for audit findings identified in the 2008 LDAR Third Party Compliance Audit were completed in 2008 and 2009, as reported in the July 2009 Consent Decree Semi-Annual Report.**

**No changes were made to the program during the reporting period and the required certifications were submitted as required in Paragraph 92(b).**

**Information required under Paragraph 92(c) will be submitted in the first semiannual report of 2011 under 40 CFR 63.654.**

O. Incorporation of Consent Decree Requirements into Federally Enforceable Permit(s)

**Paragraphs 93 – 96: The Philadelphia Refinery is compliant with the requirements of these paragraphs.**

II. Summary of (section V) Emissions Data

**Included herein.**

III. Description of Any Problems Anticipated with Meeting (section V) Requirements

**None**

IV. Additional Matters to be Brought to the Attention of EPA and the Appropriate Plaintiff/Intervenor

**None**

**Paragraph 112 SUPPLEMENTAL AND COMMUNITY ENVIRONMENTAL PROJECTS (SCEP) AND STATE AND LOCAL ENVIRONMENTALLY BENEFICIAL PROJECTS (SLEBP) in Section VIII with Certification**

I. Progress Report for Each SCEP or SLEBP (section VIII)

**Paragraph 104: All required work was completed during this report period and the SCR unit for the H-400 and H-401 heaters was in service on December 30, 2010.**

**Paragraph 105: Complete**

**Paragraph 106: Complete**

**Paragraph 107: Complete**

**Paragraph 108: Complete**

**Paragraph 109: Complete**

**II. Completed SCEP or SLEBP (section VIII)**

**A. Detailed Description of Each SCEP or SLEBP Project as Implemented**

**None**

**B. Brief Description of Any Significant Operating Problems Encountered**

**None**

**C. Certification That Each Project Has Been Fully Implemented Pursuant to the Provisions of this Consent Decree**

**If applicable, see the certification behind the cover letter.**

**D. Description of the Environmental and Public Health Benefits Resulting From Implementation of Each Project (including quantification of the benefits and pollutant reductions, where practicable)**

**N/A**

## Philadelphia Refinery

### **1. CD Paragraph 77(B)(i)(3) Sampling Results Philadelphia Refinery**

Sample Point ID	Sample Date	Benzene Conc (ppmw)	Avg 3rd Qtr 2010 Benzene Conc. (ppmw)	Avg 4th Qtr 2010 Benzene Conc. (ppmw)	3rd Qtr 2010 Flow (gal)	4th Qtr 2010 Flow (gal)	3rd Qtr 2010 Benzene Quantity (Megagrams)	4th Qtr 2010 Benzene Quantity (Megagrams)
210 Box Cooler (PB EOL 001)	7/6/10	0.00099	0.00099		74235000		0.0003	0.0003
	8/9/10	0.00099						
	9/7/2010	0.00099						
	10/11/10	0.00099		0.00099		74235000		
	11/8/10	0.00099						
	12/6/10	0.00099						
Klondike Effluent (PB EOL 002)	7/6/10	0.00099	0.00099		10000000		0.00004	0.00004
	8/9/10	0.00099						
	9/7/10	0.00099						
	10/11/10	0.00099		0.00099		10000000		
	11/8/10	0.00099						
	12/6/10	0.00099						
867 Effluent (PB EOL 003)	7/7/10	0.00099	0.002		22625000		0.0002	0.0005
	8/10/10	0.00099						
	9/8/10	0.004						
	10/12/10	0.008		0.006		22625000		
	11/9/10	0.0099						
	12/6/10	0.00099						
PB Grit Chamber Effluent (PB EOL 004)								
No samples taken this period - not required. Grit chamber samples were only required to be sampled for one quarter and this had already occurred in								

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Sample Point ID	Sample Date	Benzene Conc (ppmw)	Avg 3rd Qtr 2010 Benzene Conc. (ppmw)	Avg 4th Qtr 2010 Benzene Conc. (ppmw)	3rd Qtr 2010 Flow (gal)	4 <sup>th</sup> Qtr 2010 Flow (gal)	3rd Qtr 2010 Benzene Quantity (Megagrams)	4 <sup>th</sup> Qtr 2010 Benzene Quantity (Megagrams)
<b>1232 4<sup>th</sup> and M (GP EOL 001)</b>	7/6/10	0.027	0.38		71500000		0.1	0.09
	8/9/10	0.79						
	9/7/10	0.33						
	10/11/10	0.033		0.34		71500000		
	11/8/10	0.00099						
	12/6/10	1.0						
<b>231 F Box Discharge (GP EOL 002)</b>	7/7/10	0.00099	0.005		3450000		0.00007	0.0008
	8/10/10	0.003						
	9/8/10	0.012						
	10/12/10	0.039		0.06		3450000		
	11/9/10	0.08						
	12/6/10	0.053						
<b>231 Groundwater (GP EOL 003)</b>	7/6/10	*No sample	0.045		477333		0.00008	*0
	8/9/10	0.084						
	9/7/10	0.006						
	10/11/10	*No sample		*0		477333		
	11/8/10	*No sample						
	12/6/10	*No sample						
* Groundwater system not operational at the time of sampling.								
<b>#3 Separator Effluent (GP EOL 004)</b>	7/7/10	0.039	0.014		3150000		0.0002	0.00001
	8/10/10	0.00099						
	9/8/10	0.00099						
	10/12/10	0.00099		0.00099		3150000		
	11/8/10	0.00099						
	12/6/10	0.00099						

## Semi-Annual Consent Decree Compliance Report # 10

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Sample Point ID	Sample Date	Benzene Conc (ppmw)	Avg 3rd Qtr 2010 Benzene Conc. (ppmw)	Avg 4th Qtr 2010 Benzene Conc. (ppmw)	3rd Qtr 2010 Flow (gal)	4th Qtr 2010 Flow (gal)	3rd Qtr 2010 Benzene Quantity (Megagrams)	4th Qtr 2010 Benzene Quantity (Megagrams)
8 Separator Effluent (GP EOL 005)	7/7/10	0.21	0.08		8300000		0.003	0.00003
	8/10/10	0.015						
	9/8/10	0.004						
	10/12/10	0.00099		0.001		8300000		
	11/8/10	0.002						
	12/6/10	0.00099						
15 Pump house (PB Non-EOL 001)	7/6/10	2.67	0.9		15000		0.00005	0.000003
	8/9/10	0.001						
	9/7/10	0.006						
	10/11/10	0.032		0.06		15000		
	11/8/10	0.14						
	12/6/10	0.00099						
1232 Sewer M Street (GP EOL 006)	7/7/10	0.12	3.37		4700000		0.06	0.03
	8/10/10	0.00099						
	9/8/10	10						
	10/12/10	0.00099		1.67		4700000		
	11/9/10	0.00099						
	12/6/10	5.01						
V-4 Hydrobon Separator Condensate Wash (GP Non-EOL 001)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No waste was generated from this Non-EOL point during the semi-annual period.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V-603 Debutanizer Receiver								

<b>Condensate Wash (GP Non-EOL 002)</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>No waste was generated from this Non-EOL point during the semi-annual period.</i>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3rd Qtr 2010 EOL Sampling TAB = 0.16 Megagrams

4<sup>th</sup> Qtr 2010 EOL Sampling TAB = 0.12 Megagrams

Annual 2010 EOL sampling TAB = 0.28 Megagrams

*Notes:*

1. Benzene concentrations listed as 0.00099 ppm were reported by the laboratory as < 0.001 ppm which is the detection limit.
2. Average quarterly benzene concentrations are simply the arithmetic mean of the individual laboratory results for the quarter.
3. Sample calculation of 3rd Qtr Benzene Quantity for GP EOL 002:

3rd Qtr avg benzene conc. = 0.005 ppm

3rd Qtr flow = 3,450,000 gallons

So:  $\frac{0.005 \text{ ppm benzene} \times 3,450,000 \text{ gallons} \times 8.34 \text{ lbs/gallon}}{2204.6 \text{ lbs/megagram} \times 1,000,000 \text{ parts per million}} = 0.00007 \text{ Megagrams}$



**Sunoco Facility: Toledo Refinery**  
**Report Title: Semi-annual Consent Decree Compliance Report # 10**  
**Reporting Period: 7/1/10 – 12/31/10**

**Paragraph 114 Reporting and Recordkeeping of Affirmative Relief / Environmental Projects and Emission Data in Section V with Certification**

**I Progress Report for Implementation of (section V) Affirmative Relief/Environmental Projects**

**A. NO<sub>x</sub> Emissions Reductions from the FCCU**

**The SCR construction was completed and unit started up in September 2009. NO<sub>x</sub> emissions are being monitored as required. Deviations are reported separately in the quarterly and semiannual reports submitted to Ohio EPA**

**B. SO<sub>2</sub> Emissions Reductions from the FCCU**

**Wet Gas Scrubber construction was completed and unit started up in September 2009. SO<sub>2</sub> emissions are being monitored as required. Deviations are reported separately in the quarterly and semiannual reports submitted to Ohio EPA**

**C. Control of PM Emissions from FCCU**

**Wet Gas Scrubber (with particulate control) construction was completed and unit started up in September 2009. Alternative Monitoring plan is in place to monitor particulate removal efficiency. The AMP target values were set during the January 2010 performance testing. Deviations are reported separately in the quarterly and semiannual progress reports submitted to Ohio EPA.**

**D. Control of CO Emissions from FCCU**

**The Toledo Refinery is monitoring CO compliance as required. Deviations are reported separately in the quarterly and semiannual progress reports submitted to Ohio EPA.**

**E. NSPS Subparts A and J Applicability at FCCU Regenerators**

**The SCR and Wet Gas Scrubber (with particulate control) construction was completed and units started-up in September 2009. The PTI for the FCC Unit construction specified that NSPS is applicable to the FCCU regenerator.**

**F. NO<sub>x</sub> Emission Reductions from Heaters and Boilers**

**The final updated control plan was submitted 06/14/2010. Per the June 2009 CD Amendment, the plan has been modified to delete any reduction from the Tulsa refinery**

G. SO<sub>2</sub> Emissions Reductions from and NSPS Applicability for Heaters and Boilers

**Construction of the new SRU and two new Tail Gas Treating Units was completed during the 4<sup>th</sup> quarter of 2009. Both SRU/TGTU trains were in service by 12/31/2009. The new SRU/TGTU complex includes back up amine treating capability for the fuel gas system during turnarounds of the refinery amine unit.**

**New fuel gas analyzers were installed and various vents were reconfigured in the refinery fuel gas system during the 4<sup>th</sup> quarter of 2009. The new analyzers were placed in service in December 2009.**

I. Sulfur Recovery Plants - NSPS Applicability

**Construction of the SRU and two new tail gas units was completed during the 4<sup>th</sup> quarter of 2009. Both SRU/TGTU trains were in-service by 12/31/2009. SO<sub>2</sub> emissions are being monitored as required. Deviations are reported separately in the quarterly and semiannual reports submitted to Ohio EPA.**

J. Hydrocarbon Flaring Devices

**Sunoco received approval from USEPA for its Plant 4 flare Alternative Monitoring Plan in May 2010. The car seals specified in the plan are in place and the refinery is complying with monitoring specified. As described in the original monitoring plan, updates are to be submitted with subsequent reports.**

**The Plant 9 flare AMP was submitted to USEPA for approval in October 2010. The approval was received in December 2010. The car seals specified in the plan are in place and the refinery is complying with monitoring specified.**

K. Control of Acid Gas Flaring and Tail Gas Incidents

**Incident Investigation and Reporting program was implemented as of 03/14/06. There were no acid gas flaring incidents between 07/01/10 and 12/31/10.**

L. Control of Hydrocarbon Flaring Incidents

**Incident Investigation and Reporting program was implemented as of 03/14/06. One hydrocarbon flaring incident occurred between 07/01/10 and 12/31/10. Attached with this report is the hydrocarbon flaring incident report for the incident which occurred on 9/24.**

M. Benzene Waste NESHAP Program Enhancements

**1. Required Training on BWON Controls has been implemented through:**

- **Weekly Safety Topics for Refinery Employees.**
  - **HES Supervisory Training for Management & Supervision.**
  - **CA Training for Contract Administrators.**
  - **Sampling Procedure for BWON Coordinator.**
  - **Computer Based Learning for Refinery Employees.**
2. **The BWON exempted quantity was calculated for the third (0.14 MG) and fourth (0.15 MG) quarters of 2010. This results in an estimated 2010 BWON exempted quantity of 1.0 MG; which is under the 2 MG exemption.**

N. Leak Detection and Repair Program Enhancements

1. **Required Training on LDAR has been implemented through:**
  - **Weekly Safety Topics for Refinery Employees.**
  - **CA Training for Contract Administrators.**
  - **LDAR Contractor Training & Exams provided by EA, Inc.**
  - **Sunoco LDAR Conference for LDAR Coordinator.**
  - **Computer Based Learning for Refinery Employees.**
2. **LDAR Coordinator Stephenie Sibberson attended Annual LDAR Refresher Training presented by Sage Environmental Consulting in December 2010.**
3. **The LDAR Coordinator for the reporting period is Stephenie Sibberson.**
4. **3<sup>rd</sup> party LDAR audit was completed in September, 2010.**

O. Incorporation of Consent Decree Requirements into Federally Enforceable Permit(s)

**An updated Title V permit application that included the CD requirements was submitted to Ohio EPA in accordance with Ohio EPA preferences during the 2<sup>nd</sup> half of 2006. The Permit to Install for the CD control devices/refinery upgrades also included the CD requirements for emission limits and standards. . A Permit-to-Install application was also submitted to incorporate NSPS requirements for the heaters and boilers and flare in December 2009. TDES is in the process of revising the Title V permit for the Toledo refinery.**

II. Summary of (section V) Emissions Data

N/A

III. Description of Any Problems Anticipated with Meeting (section V) Requirements

N/A

**IV. Additional Matters to be Brought to the Attention of EPA and the Appropriate Plaintiff/Intervenor**

N/A

**Paragraph 112 SUPPLEMENTAL AND COMMUNITY ENVIRONMENTAL PROJECTS (SCEP) AND STATE AND LOCAL ENVIRONMENTALLY BENEFICIAL PROJECTS (SLEBP) in Section VIII with Certification**

**I. Progress Report for Each SCEP or SLEBP (section VIII)**

Activity completed and reported in previous semiannual report

**II. Completed SCEP or SLEBP (section VIII)**

Activity completed and reported in previous semiannual report

**A. Detailed Description of Each SCEP or SLEBP Project as Implemented**

None

**B. Brief Description of Any Significant Operating Problems Encountered**

None

**C. Certification That Each Project Has Been Fully Implemented Pursuant to the Provisions of this Consent Decree**

See the certification behind the cover letter.

**D. Description of the Environmental and Public Health Benefits Resulting From Implementation of Each Project (including quantification of the benefits and pollutant reductions, where practicable)**

N/A

# **APPENDIX I**

## **Toledo Refinery**

### **Hydrocarbon Flaring Incident**



## Investigation Report for Acid Gas Flaring, Hydrocarbon Flaring or Tail Gas Incidents Resulting in $\geq 500$ lbs. of $\text{SO}_2$ Released

<b>Date of Report:</b>	11/5/2010		<b>Incident Type</b>  (Check one)	<b>Acid Gas Flaring:</b> <input type="checkbox"/>
<b>Agency Report #</b>	1009-48-2686			<b>Tail Gas Incident:</b> <input type="checkbox"/>
<b>Date(s) of Incident:</b>	(Beginning)	(End)	<b>1<sup>st</sup> Flaring start/end time:</b>	09/23 22:30 – 9/24 02:28
	09/23/2010	09/24/2010	<b>2<sup>nd</sup> Flaring start/end time:</b>	09/24 11:30 – 17:11
			<b>3<sup>rd</sup> Flaring start/end time:</b>	
<b>Amount of <math>\text{SO}_2</math> Released:</b>	See attached Form	Pounds <input type="checkbox"/>	<b>Location at the Toledo Refinery:</b>	<b>Plant 4 Flare</b> <input checked="" type="checkbox"/>
	0.31	Tons <input checked="" type="checkbox"/>		<b>Plant 9 Flare</b> <input type="checkbox"/>
				<b>SRU Incinerator Stack</b> <input type="checkbox"/>

### Incident Description:

This hydrocarbon flaring RQ release was the result of two unrelated events. First, on 23-Sept-10 at 18:55, Sunoco shut down the FCC unit due to vibrations in the expander. While the FCC was down, there was intermittent flaring off the front end of the Wet Gas Compressor, C-421, from 22:30 23-Sept-10 to 02:28 24-Sept-10 as a result of unstable gas composition.

Second, unrelated to the above situation, at 11:30 24-Sept-10, Toledo refinery experienced a power dip which caused C-421 to shut down and the flare valves to open. Initially the saturate gas compressor, C-416, continued to operate however at 12:45 24-Sept-10 it was also shut down. As a result, all refinery saturate gas was routed to the flare so it could be safely burned. The compressors, C-421 and C-416 were restarted at 13:11 and 13:16 24-Sept-10 respectively. The C-421 restart had been held up and flaring extended for approximately one hour due to plugged drain lines on the machine. There was minor additional flaring between 14:14 and 17:11 as refinery personnel were stabilizing the compressor operation and starting up the FCC unit.

### Steps taken to limit duration of flaring or quantity of $\text{SO}_2$ /Hydrocarbon released (Corrective Actions):

Emissions from this incident were minimized because the FCC unit was not operating while the compressors were down. As stated above the FCC was down due to an unrelated mechanical problem within the unit.

**Root Cause of Incident:**

This release was caused by a power supply interruption from Toledo Edison, the refinery's third party electric source, due to severe weather. After an extensive line patrol by Edison on 24-Sep-10, no apparent cause was identified

**Contributing Causes of Incident:**

N/A

**Preventive Actions (Actions to reduce likelihood of Recurrence):**

- Review event with Toledo Edison/First Energy to ensure both Sunoco and Edison understand the interruption.
- Verify Gas Plant procedures address means to maintain C-421 stability when the FCC Unit is shutdown.
- Clean C-421 drain lines to avoid delays in the compressor start-up procedure.

**Do Stipulated Penalties Apply?**

YES

☐

NO

☒

If YES explain:

If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:

N/A: ☐

Completed: ☒

Not Completed: ☐

Explain:

**Approval Section**

Title	Print Name	Signature	Date
Operations Manager:	J. Parsil	Amy M. Wagner (for JCP)	11/5/2010

<b>Environmental Manager:</b>	E. Moore	Elaine M. Moore	11/4/2010
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<b>Date of Incident:</b>	09/24/2010	<b>Incident Type</b>	<b>Acid Gas Flaring:</b> <input type="checkbox"/>
<b>Agency Report #</b>	1009-48-2686	(Check one)	<b>Hydrocarbon Flaring</b> <input checked="" type="checkbox"/>
			<b>Tail Gas Incident:</b> <input type="checkbox"/>

**Calculation of Quantity of SO<sub>2</sub> Released from Gas Flaring (Round to the nearest 0.1 Tons):**  
Tons of SO<sub>2</sub> = [FR][TD][ConcH<sub>2</sub>S][8.44x10<sup>-5</sup>] (See p. 52 of 114 CD)  
FR = Average Flow Rate of Gas During Flaring Incident in scfh  
TD = Total Duration of Flaring Incident in hours  
ConcH<sub>2</sub>S = Average Concentration of Hydrogen sulfide in gas during flaring incident  
8.44x10<sup>-5</sup> = [lb mole H<sub>2</sub>S/379 scf H<sub>2</sub>S][64 lbs SO<sub>2</sub>/lb mole H<sub>2</sub>S][1 Ton/2000 lbs]

**Reason for any missing data:** No data missing  
**Basis for any data that was estimated:** Flows were estimated based on process operating conditions during the release. Concentrations were based on the unit design and recent gas samples.

Release No. 1:  
[(24,000 scfh)\*(1.32 hrs)\*( 0.011 mol H<sub>2</sub>S/mol gas)\*(8.44E-05)] = 0.03 tons (60 lb)

Release No. 2:  
[(65,000 scfh)\*(3.44 hrs)\*( 0.011 mol H<sub>2</sub>S/mol gas)\*(8.44E-05)] +  
[(136,000 scfh)\*(0.47 hrs)\*( 0.013 mol H<sub>2</sub>S/mol gas)\*(8.44E-05)] = 0.28 tons (560 lb)

Release No. 3:

**Tons of SO<sub>2</sub> = 0.3 ton total SO<sub>2</sub> released**

**Rate of SO<sub>2</sub> Emissions During Gas Flaring: ER = [FR][ConcH<sub>2</sub>S][0.169]**  
ER = Emission Rate in pounds of SO<sub>2</sub> per hour  
Pounds per hour of SO<sub>2</sub> = [FR][ConcH<sub>2</sub>S][0.169] (See p. 52 of 114 CD)  
FR = Flow Rate of Gas During Flaring Incident in scfh  
ConcH<sub>2</sub>S = Average Concentration of Hydrogen sulfide in gas during flaring incident  
0.169 = [lb mole H<sub>2</sub>S/379 scf H<sub>2</sub>S][1.0 lb mole SO<sub>2</sub>/1 lb mole H<sub>2</sub>S][64 lbs SO<sub>2</sub>/lb mole SO<sub>2</sub>]

**Reason for any missing data:** No data missing  
**Basis for any data that was estimated:** Flows were estimated based on process operating conditions during the release. Concentrations were based on the unit design.

**Emission Rate of SO<sub>2</sub>**

Release No. 1: ER = : [60 lb SO<sub>2</sub>/hr]/[1.32 hr] = 45 lb SO<sub>2</sub>/hr

Release No. 2: ER = : [560 lb SO<sub>2</sub>/hr]/[3.44 hr] = 162 lb SO<sub>2</sub>/hr

**Comments:**

	Name	Title	Date
<b>Calculation Performed by:</b>	L. Balogh	Lead Env. Eng.	11/4/2010
<b>Calculation Reviewed by:</b>	E. Moore	Env. Manager	11/4/2010